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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

LEUNG, JENNIFER A

ART UNIT

PAPER NUMBER

1797

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/076,915	Applicant(s) TONKOVICH ET AL.	
	Examiner JENNIFER A. LEUNG	Art Unit 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 November 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 5,13-23,80-86,96 and 98-100 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 5,80,81,83,84,86 and 98 is/are allowed.
- 6) ☒ Claim(s) 13-17,21,82,85,96,99 and 100 is/are rejected.
- 7) ☒ Claim(s) 18-20,22 and 23 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. Applicant's amendment filed on November 6, 2009 has been considered. The amendment to claims 81 and 82 overcomes the previous rejections under 35 U.S.C. 112, second paragraph. However, upon further consideration and an updated search, the indicated allowability of claims 13-17, 21, 82, 85, 96, 99 and 100 is withdrawn. The finality of the last Office action is withdrawn, and rejections based on the newly cited reference(s) follow.

Claim Objections

2. Claim 82 objected to because of the following informalities: "the straight, unobstructed line" (line 18) should be changed to --a straight, unobstructed line--, for proper antecedent basis. Appropriate correction is required.

Claim Rejections - 35 USC § 102 and § 103

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any

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evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claim 82 is rejected under 35 U.S.C. 102(b) as being anticipated by Burdon et al. (WO 00/21659).

Burdon et al. (see, e.g., FIG. 14; also, page 36, line 26, to page 38, line 16) discloses a process comprising: stacking a plurality of shims (i.e., layers **436**, **438**, **440**, **442**) such that a continuous microchannel flow path (i.e., including cavity **446**) is formed through the shims; said microchannel flow path **446** being substantially parallel to the shim thickness (see FIG. 14); wherein the plurality of shims comprises at least three shims **436**, **438**, **440**, **442** through which the microchannel flow path **446** is formed, and wherein the microchannel flow path **446** has a minimum dimension (height or width) of at least 10 μm (see page 24, lines 9-22); bonding the shims **436**, **438**, **440**, **442** to form a device capable of performing a unit operation on a fluid (see page 23, line 22 to page 24, line 25); passing the fluid into the device (e.g., via one or both channels **448**, **450**) such that the fluid passes through the microchannel flow path **446** in said shims **436**, **438**, **440**, **442**; performing the unit operation (i.e., a chemical reaction) on the fluid as it passes through the microchannel flow path **446**, wherein a straight unobstructed line is present in said at least three shims **436**, **438**, **440**, **442** (see FIG. 14); and wherein the microchannel flow path **446** comprises a metal film (i.e., a sintered film of catalyst **452**, e.g., of metals such as platinum, palladium and rhodium; see page 37, line 5 to page 38, line 16).

4. Claims 13-17 and 96 are rejected under 35 U.S.C. 102(b) as being anticipated by Hirsch (US 3,712,595).

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Hirsch discloses a process comprising: stacking a plurality of shims (i.e., rigid plates **4**, **5**, **6**, **7**) such that a continuous flow path is formed through the shims (i.e., through a first series of aligned openings **8** in the plates; see FIG. 2); said flow path being substantially parallel to the shim thickness (see FIG. 2); wherein the plurality of shims comprises at least three shims **4**, **5**, **6**, **7** through which the flow path is formed and a straight, unobstructed line is present through the flow path in said at least three shims (i.e., an unobstructed line is present in at least one of the series of aligned openings **8**; see FIG. 2); bonding the shims (i.e., by conventional means, such as welding at spots **11**) to form a device capable of performing a unit operation on a fluid (i.e., a vapor); passing the fluid into the device such that the fluid passes through the flow path in said shims; and performing the unit operation on the fluid as it passes through the flow path in which the straight, unobstructed line is present in said at least three shims; wherein the unit operation comprises separating (e.g., via distillation; see abstract; column 1, lines 10-32); and wherein the flow path in said three shims (i.e., via the first series of aligned openings **8**) does not connect with any other flow paths (i.e., it does not connect with a second series of aligned openings **8**). The process further comprises the step of passing a second fluid (i.e., a liquid; a portion of liquid will be inherently entrained with the vapor during the distillation process) through a second flow path in said at least three shims (i.e., via the second series of aligned opening **8**), said second flow path being substantially parallel to the shim thickness (see FIG. 2); and wherein the fluid which passes through the first flow path and the second fluid which passes through the second flow path do not mix within the flow paths.

5. Claims 85, 99 and 100 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirsch (US 3,712,595).

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Hirsh discloses that the device comprises at least three shims (i.e., four plates **4**, **5**, **6**, **7**; FIG. 2). Hirsch, however, does not specifically disclose at least five shims. In any event, it would have been obvious for one of ordinary skill in the art at the time the invention was made to select an appropriate number of shims, such as at least five shims, for constructing the device in the process of Hirsch, because the duplication of parts for a multiplied effect was held to be obvious. See MPEP 2144.04. As noted in Hirsch (see, e.g., column 3, lines 43-60), the shims are stacked to provide resistance to the flow of vapors through the center of the column, wherein the resistance is influenced by the length of the flow path through the shims. It would have been obvious for one of ordinary skill in the art to provide additional shims in order to provide additional resistance to the flow of vapors, as appropriate for establishing a uniform flow.

6. Claims 13, 15-17, 21, 85 and 100 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bottcher et al. (US 5,657,818) and "Partial Condenser" (Retrieved from <http://www.chemeng.ed.ac.uk/~jwp/headstart/separation/pcon.html>).

Regarding claims 13, 15, 85 and 100, Bottcher et al. (see FIGs. 1-5; column 1, line 50 to column 2, line 49) discloses a process comprising: stacking a plurality of shims (i.e., sheets **2**) such that a continuous flow path is formed through the shims (e.g., a continuous channel **1**, as formed by aligned openings **7**); wherein the flow path **1** is substantially parallel to the shim **2** thickness (see FIGs. 1, 2); wherein the plurality of shims comprises at least three (or at least five) adjacent shims **2** through which the flow path **1** is formed, and a straight, unobstructed line is present through the flow path in said shims (see FIGs. 1, 2); bonding the shims **2** to form a device capable of performing a unit operation on a fluid (see column 2, lines 32-37, 49-55); and passing the fluid into the device such that the fluid passes through the flow path **1** in which the

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straight, unobstructed line is present in said shims; wherein the flow path **1** in said shims **2** does not connect with any other flow paths.

Bottcher et al. discloses that the device may be used as a “part-condenser” (see column 2, lines 49-55). A part condenser inherently performs the unit operation of separating (i.e., it is the simplest vapor-liquid separation device for gas mixtures; see “Partial Condenser”). Accordingly, it would have been obvious for one of ordinary skill in the art at the time the invention was made to conduct the unit operation of “separating” on the fluid as it passes through the flow path **1** of the Bottcher et al. device.

Regarding claims 16, 17 and 21, Bottcher et al. discloses passing a second fluid through a second flow path in said at least three shims (i.e., as defined by aligned flow spaces **4**), wherein the second flow path is substantially parallel to the shim thickness (see, e.g., FIG. 2), wherein the fluid in the flow path **1** and the second fluid in the second flow path **4** do not mix, and wherein the second flow path is a heat exchange fluid (i.e., for enabling the part-condensing).

Allowable Subject Matter

7. Claims 5, 80, 81, 83, 84, 86 and 98 are allowable for the same reasons set forth in the Office Action mailed January 21, 2009.

8. Claims 18-20, 22 and 23 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Regarding claims 18-20 and 22, the prior art does not disclose or adequately suggest the claimed process comprising the steps of stacking and bonding a plurality of shims, and passing a fluid through a flow path and a second fluid through a second flow path formed in the plurality

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of shims, wherein the unit operation of separating is conducted on the fluid in the flow path, wherein the fluid in the flow path and the second fluid in the second flow path are separated by a distance of 5 mm or less, and wherein the pressures in the flow path and the second flow path differ by at least 1 atm.

Regarding claim 23, the prior art does not disclose or adequately suggest the claimed process comprising the steps of stacking and bonding a plurality of shims, and passing a fluid through a flow path and a second fluid through a second flow path formed in the shims, wherein the unit operation of separating is conducted on the fluid in the flow path, and the second fluid in the second flow path comprises a reaction composition which reacts exothermically.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JENNIFER A. LEUNG whose telephone number is (571) 272-1449. The examiner can normally be reached on 9:30 am - 5:30 pm Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter D. Griffin can be reached on (571) 272-1447. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jennifer A. Leung/
Primary Examiner, Art Unit 1797